Before the:

Department of Commerce,

National Telecommunications and Information Administration

And

Department of Agriculture,

Rural Utilities Service

Washington, D.C. 20230

Docket No. 090309298-9299-02

American Recovery and Reinvestment Act of 2009 Broadband Initiatives

Response of Request for Information

By

Cumberland Internet, Inc.

David Glynn
Clair Kaye
P.O. Box 190
Greenup, IL
217 923-5115

Executive summary

Rural broadband service is made up of three elements, each having unique issues that combine to create the underserved market in rural America.

Delivery to residents and businesses.

Cable and DSL service can not serve the rural population due to economic constraints driven by the geographic distribution of the population of the rural market. The most common distribution technology to effectively deliver broadband to rural areas is currently wireless using public spectrum.

Distribution of connectivity

Wireless network that can deliver broadband connectivity to large rural areas effectively and reliably will require considerable investment. Existing deployments tend to be cost constrained, limited in design, and these existing network designs may not scale to the needs of serving higher speeds to greater quantities of users.

Sourcing Connectivity

100 megabits/second of connectivity purchased in a large data center may cost $1,500 a month. An equivalent expenditure in a rural community buys a 1.5 megabits/second T-1 telephone circuit. The cost of delivering bandwidth to a rural area is the constraining element, not the actual cost of the bandwidth itself. A method of connecting these rural areas to competitive markets for purchasing bandwidth will allow rural service providers to focus resources on providing service.

The analogy for connecting rural areas to the Internet is a city water distribution system. If you're going to have water at your business, you must have two things:

a pipe that is big enough to bring you the amount of water you would like to use at your business

a water source, like a water tower, to put water into the pipe for you to use at your business

If I want to buy internet connectivity (“the water”) and my business is in a large urban area (“directly underneath the water tower”) then I could purchase 100 megabits/second of connectivity for $1,500 a month (“a lot of water”) and that would include both the water and the pipe.

If my business is located in a rural area (“far away from the water tower”), I must purchase both the pipe to bring the water to my distant location and purchase internet connectivity (“the water”). If I want 1.5 megabits/second of connectivity it would cost $1,500/month. While the water itself is still affordable, the pipe to bring me the water is about 70 times more expensive than in the urban area.

A method of connecting the rural areas to competitive markets (“the water pipes”) for purchasing bandwidth (“the water”) will allow rural service providers to focus resources on providing service.

Underserved

So, the aspects of rural areas being underserved can be defined by these three elements.

- The difficulties of providing a last mile solution that reliably delivers true broadband.
- The need for an efficient and effective local distribution network to power this last mile solution.
- Access to competitive markets for wholesale bandwidth for local service providers.

The Definition of Underserved.

Last Mile

Cable companies do not deliver service outside of towns. The cost of wiring is prohibitive for them to justify based on projected returns.

DSL service from telephone companies is not often available in rural towns. To provide DSL service beyond the core of a rural town requires costly signal repeater equipment. This has traditionally prevented telephone companies from making service available outside of areas with higher population density.

Wireless access using public spectrum has been the most common method of distribution in areas outside of rural communities. Wireless distribution limitations include initial deployment cost, constraints on delivery due to interference(both spectrum and physical), and total bandwidth capacity.

Local Distribution

Cable offers bandwidth speeds that burst up to 10 megabits/second. DSL can deliver up to 6 megabits/second in urban markets. Wireless access in rural areas rarely exceeds 1 megabit/second, and is usually ranging from 256 kilobits/second to 512 kilobits/second.

Rural wireless speeds are usually limited by the cost of high speed bandwidth delivery to a rural town, and the limitations of network equipment and designs. The evolution of wireless network equipment in recent years has been dramatic, with capacities and capabilities expanding rapidly.

Access to Competitive Markets for Bandwidth

Rural wireless providers resell bandwidth that they purchase wholesale, usually delivered over T-1 circuits(1.5 megabits/second).

This bandwidth must be purchased from another market, and then brought in over the existing telephone network on these T-1 circuits. The rural internet provider must pay for the wholesale bandwidth, the local T-1 circuit that terminates in their data center, the long-haul circuit that reaches to the source of their bandwidth purchase, any exchange crossing that occur getting the circuit to the source of the bandwidth, and the termination of the local T-1 circuit at the point of bandwidth purchase.

In Greenup, IL, a T-1 from Indianapolis, IN, makes three exchange crossings, involving three seperate phone companies, and costs $1,700 per month. That is a bandwidth cost of $1,166 per megabit per month. Our current costs are based on a national fire sale that AT&T offered when they were trying to make themselves look good for a sale to SBC, and are currently $900/month for each T1(we have two in Greenup). This price is something that AT&T has been trying to buy us out of our contract for 3 years, since the cost of local termination(i.e. local delivery by the LEC Verizon) is $780/month per T-1, so AT&T is paying roughly 50% more than they are charging us just to deliver the circuit, separate from bandwidth costs.

In Effingham, IL, 18 miles from Greenup, I can buy what the LEC calls a Metro-Ethernet circuit(which is in fact a third generation symmetric DSL connection using equipment from a company called Zhone) with 2.5, 4, or 7 megabits/second. The 4 megabit/second circuit costs $800/month, or $200/megabit a month.

A recent quote from a regional telephone company in Illinois to provision a DS-3 circuit delivering 45 megabits/second to rural town stated that initial constructions charges would be $60,000, with a monthly charge of $30,000/month.

Large data centers in cities like Chicago, Los Angeles, and Reston, VA house many bandwidth providers. If you bought a "rack" for your routers and servers you can purchase bandwidth from any of the providers also co-located in the same data center. Bandwidth in these data centers can be priced as low as $12/megabit per second per month.

Case Study

Cumberland County, in East Central Illinois, has a population of 11,253 in 4,368 households spread over an area of 347 square miles. Roughly 5,000 people, or 45% of the county population live in towns and villages. The other 6,000, or 55% of the population, live in unincorporated rural areas.

Cumberland Internet, Inc. has been providing internet access to residents of Cumberland County since November of 1995. Initial service was dial-up access, and in 1999 we started delivering internet access over wireless connections.

The initial wireless deployment was in response to inquiries from the local development groups. They had mentioned that in attempting to attract businesses to site in Cumberland County that high speed internet access was rapidly becoming a requirement. In response to this need, we decided to finance and construct one of the first wireless internet services for a rural area in the US.

Since this initial deployment our service area has expanded from two initial deployments to over a dozen.

Roughly half of the towns in Cumberland County are currently served by a cable company that offers high speed internet services. The local phone company offers no internet services at all. This still leaves over 60% of the county population without access to wired internet services.

Internet access in schools in Cumberland County is delivered through a combination of state and federal subsidies that provide access to T-1 circuits delivering 1.5 megabits per second. The subsidies paid on behalf of state and federal agencies also require the connection to go through a non-local provider. This reduces the aggregate bandwidth demand in our County and actually causes harm to small rural providers because these State or Federal customers are some of the biggest customers in our area (School District, County government, USDA, Social Security Office, etc).

Some municipal agencies receive internet access through similar arrangements with the state. Others find it easier and cheaper to get their internet access from us.

Emergency services communications remains limited to traditional police and fire radio services. Additional services are limited by lack of access to reliable affordable internet access, and a lack of standards for equipment, maintenance, and usage for new services. These agencies can't afford the time or money needed to experiment with different aspects of technology, and they don't have easy access to experienced vendors and service providers to help them take advantage of new technologies.

Benefits

The enhancement of rural broadband access and capability seem to already have been accepted as desirable. But there are bound to be benefits that are not foreseen, such as the development of large markets for high capacity, reliable wireless equipment with different demands than existing wireless markets. The need for capacity, reliability, and ruggedness in rural deployments, and the associated quantity of equipment required, is likely to drive this new market. Rural wireless deployment, with the scale of production, reliability, durability, and variety of service types needed, is going to become a vibrant market for development and advances. Very smart people in urban technology companies are

going to be thinking very hard about how to effectively meet the demands of providing service to areas with wide population distributions, high speed network needs, and weather that will kill you if you aren't careful.

The primary benefit to people living in areas like Cumberland County has mostly to do with children.

Residents of Cumberland County want their children to have all the opportunities of children in other areas. The tend to view internet access as one of those things that can help a child grow and learn about the world while continuing a way of life that is integral to the health and well-being of this country. People who work in the agricultural industry in this country are, by definition, going to be living in low population areas. The people that choose this life know this going in, and there are also a great many benefits to a life like this, but they are in fact removed from the larger world as most of us know it.

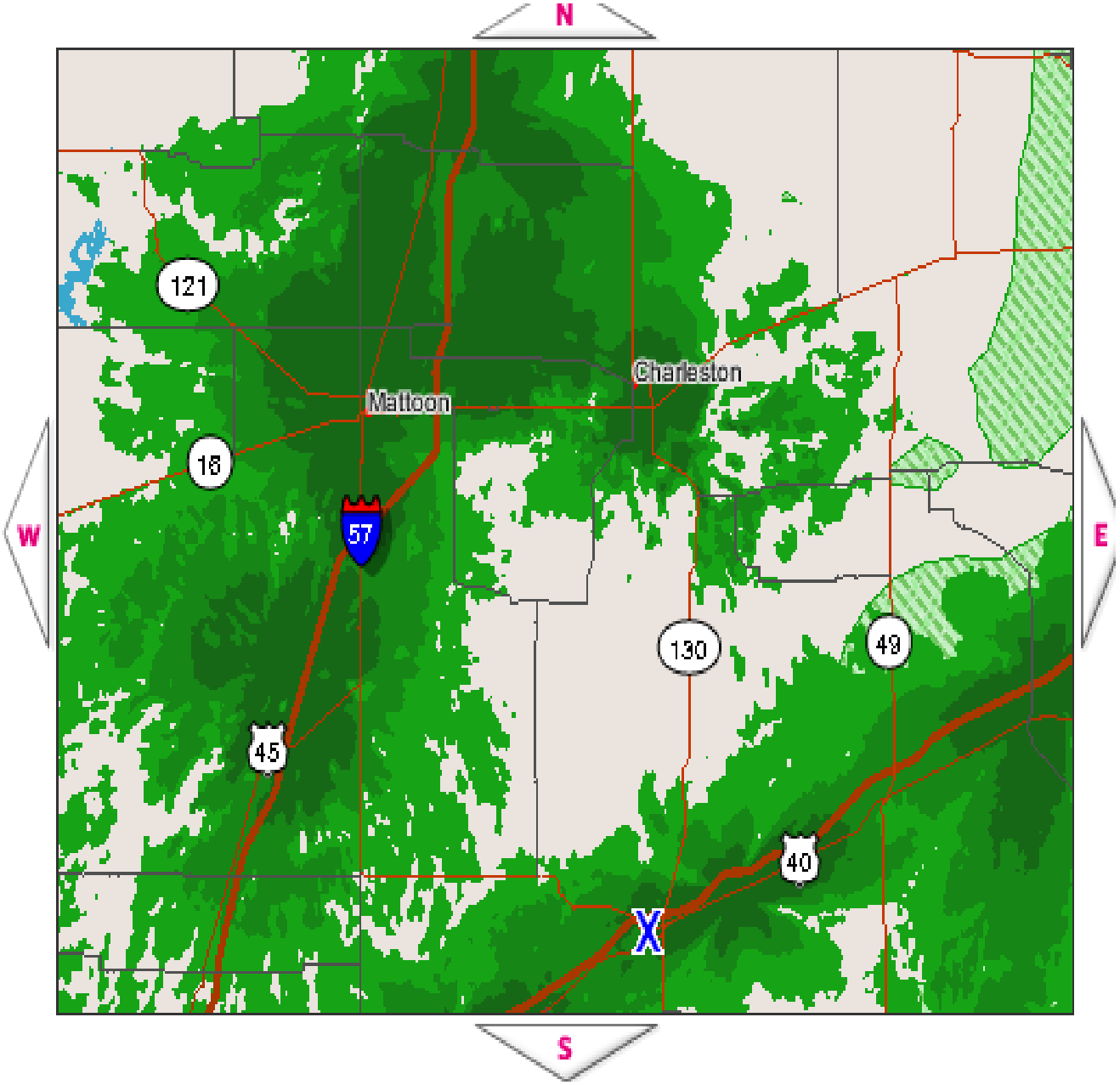
Many parents raise children in these areas, send them off to local community and state colleges, and want their children to have the opportunities that education makes available to their kids. Evidence of this is seen in Washington DC every summer as van and bus loads of rural kids are shipped off to the museums and monuments of our capitol. As a result, happily, many of these children find work in rewarding fields that allow them to raise that favorite crop of the rural family, grandchildren.

But there is still the sadness that goes along with any exodus. The parents can use the internet to stay in touch with children removed, but they would also hope that there were opportunities in a new world of communication to allow the elimination of distance. To allow the expansion of good jobs into newer regions, the opportunity to eventually have some of these children live and work in the communities in which they themselves grew up. The hope is that some day these children won't be required to leave to reach their potential, or might be able to choose to return and find good jobs, and that their communities can receive the benefits of not just work and income, but also people, able to make their own lives in these rural areas.

T-Mobile Coverage in Cumberland County

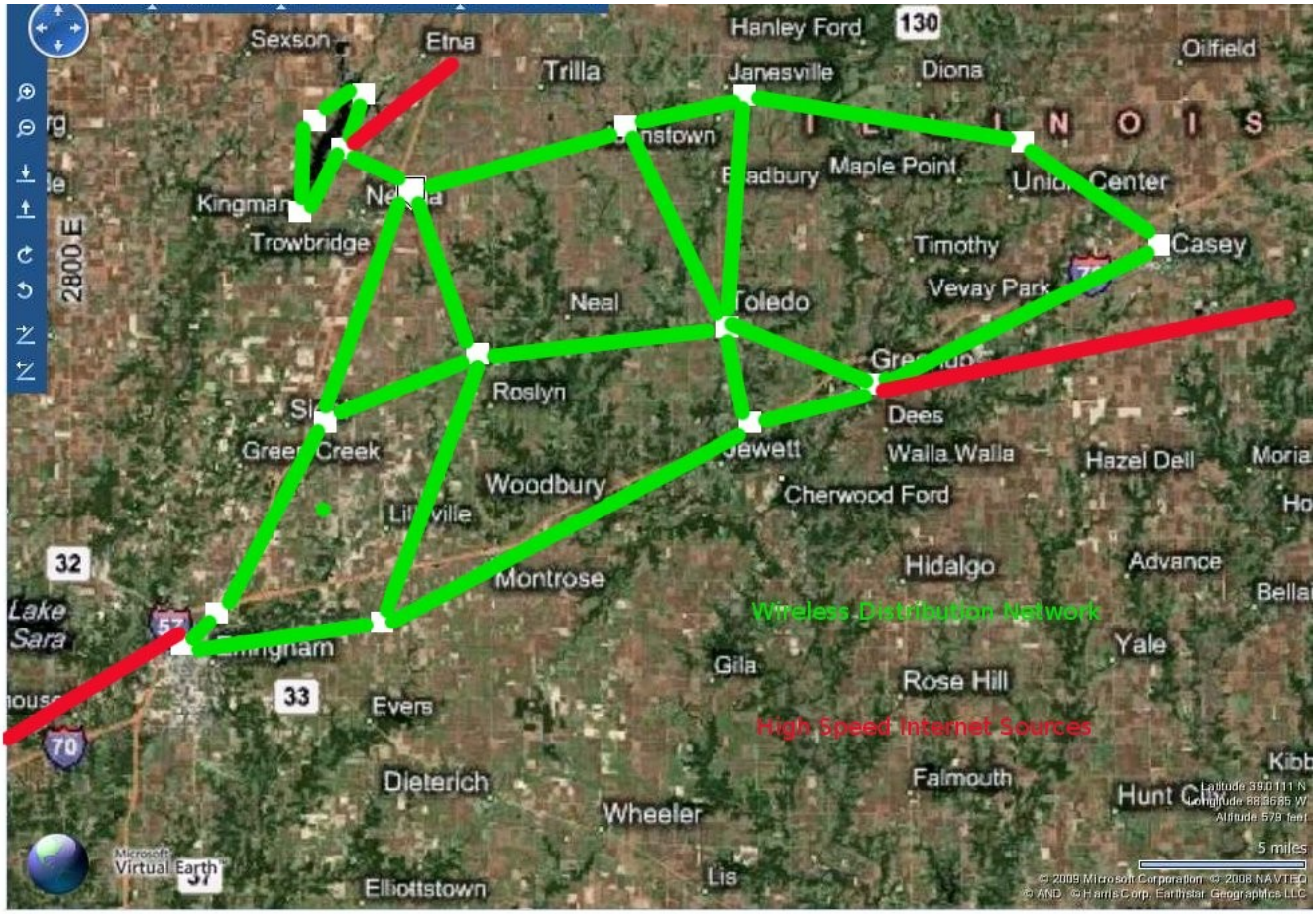
In Redwood City, CA, in the heart of Silicon Valley, performance test have shown 337kbps up and 841kbps down. There is a monthly 5 Gigabyte limit on downloads(approximately 15 hours of usage at maximum download speed).

People sometimes ask us about the availability of internet access through the cellular providers. This is a map of the coverage of T-Mobile service in Cumberland County. Our county is the large white space above the blue X, with no service in between the highways.



Cumberland Internet
Greenup, IL

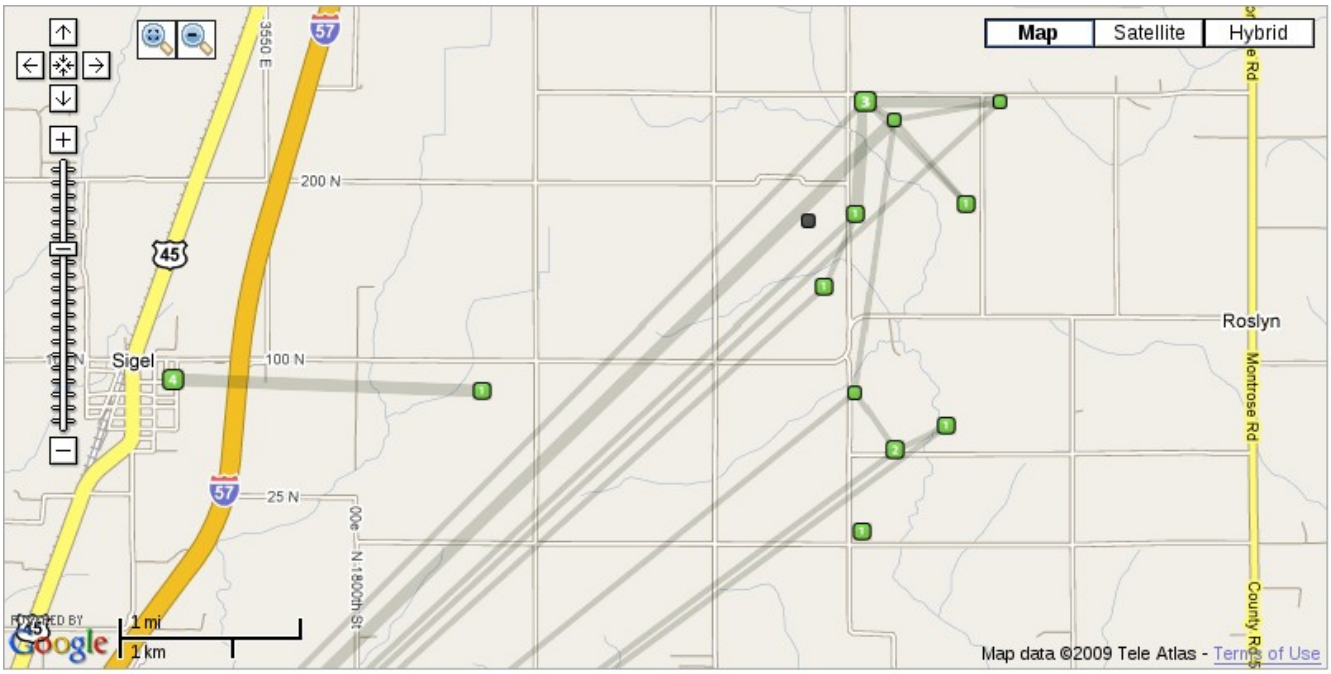
Cumberland Internet Wireless Distribution Network



Green is the Cumberland Internet Wireless Distribution Network
Red is the outside telephone circuits providing connectivity for the county

Typical Wireless Distribution for Residences

This is a wireless network East of Interstate 57, supplying connectivity to about a dozen residences over a 3 square mile area. Each residence has a wireless router that participates in a meshed network for reliability.



Cumberland Internet
Greenup, IL